M. J. Lichtenstein, a relative, I believe, of the late distinguished Prussian zoologist. These gentlemen, since the first discovery of the disease in France in 1868, have devoted much of their time to it. They have compared their observations with those of others who in other countries have studied the insect, especially Mons. Laliman, of Bordeaux, Mr. Riley, of Missouri, and with those of Prof. Westwood in our own country; and they have now, in a pamphlet which, by some inversion of dates not uncommon abroad, is supposed to form part of the Proceedings of the session of the French scientific congress at Montpellier in 1868, given a *résumé* of nearly five hundred memoirs, communications, or journal articles which have been published on the subject up to the close of last year (1871).

The main facts given as having been hitherto elicited as proved or probable may be shortly resumed as follows:—

The *Phylloxera*, like other Aphides, goes through a number of apterous generations of a single sex, but multiplying with enormous rapidity; for one or two individuals will lay as many as five hundred eggs, fertilised without previous copulation. It also gives birth occasionally to a winged generation of both sexes, the females of which lay only two or three eggs each.

The apterous *Phylloxera* is also dimorphous, a smooth-bodied form living in little galls formed on the leaves of the vine, where it is comparatively harmless; and a tuberculate form living in the nodules it produces on the root-fibres, causing first the smaller and then the main roots to rot, weakening, in the first instance, and finally killing the whole vine. Each form has its winged ganeration.

The insect is evidently of North American origin, although the precise history of its transmission to this country has not been ascertained. It was first described by Asa Fitch in the Transactions of the New York State Agricultural Society for 1854; but living there chiefly on the leaves of the native vines, it had not attracted any peculiar attention. More recently, however, Mr. Riley has found reason to attribute to the ravages of the subterranean form the ill success of the various attempts made to establish in America the European grape-vine. In England, where the introduction of the insect from America may be readily conceived, Prof. Westwood's attention was first called to it in 1863, and again from various quarters in 1867 and 1868, whence resulted the above-mentioned account in the *Gardener's Chronicle* for January 1869 (p. 109). With us it does not appear to have spread much, and has therefore not called for any further observation, the damp soil, the mode of treatment, or other external circumstances, proving unfavourable for the development of the underground form. But having by some means reached and established itself in the dry, naturally-drained vineyards of the south of France its general character underwent a change; natural selection at once gave an enormous preponderance to the underground over the epiphyllous form. It was first discovered there in July 1868, and by the close of that year its ravages caused a panic among the vine-growers in many parts of Lower Languedoc and Provence, similar to that which we may remember in this country on the rapid spread of the potato disease in the autumn of 1845. It was immediately made the subject of scientific investigation, which has ever since been steadily pursued. As one result Dr. Planchon inclines to believe that the oïdium and the potato disease, like the *Phylloxera*, and, in former days, the American blight of our apple-trees, had all been imported from America. It would seem that all these parasites, whether insects or fungi, capable of enormously rapid and extensive propagation, remain unnoticed so long as they are kept in check by the mutual relations of their constitution, habits, food, and other circumstances in which they are placed; but that the moment that a change, often very slight, in one or other of these conditions destroys the balance, they may at once and suddenly gain the upper hand, so as to be classed in the popular mind amongst those varied phenomena collectively designed as blights. That such a change is often the consequence of the transportation of the insect from one country to another may be regarded as more probable if Riley is correct in his belief that in America, as in Europe, introduced insects, when once established, are more noxious than indigenous ones. In the case of the *Phylloxera* some clue to the nature of the influencing alteration may be derived from the success attending one of the remedies applied, the inundation and continued submersion of the diseased vineyards during the winter months. The comparative dryness of the soil in the new over that of the original station of the insect has been the change which natural selection seems to have seized upon to effect the extraordinary development of the underground form, aided, perhaps, by some slight attendant change in its constitution. Prolonged, or even temporary inundation, is not however, practicable in the majority of the South of France vineyards, nor, indeed, in any of those producing the best wines. Amongst other remedies, soot (the soot of wood-smoke I presume) promises to be one of the most efficacious applications.

Amongst the various publications which these phenomena have called forth, we may still see cropping up not unfrequently the popular notion that they are blights mysteriously connected with meteorological conditions, against which it is vain to struggle; but, fortunately, the need of separately investigating every one of them is becoming generally recognised. In France, Government has appointed special commissions for inquiries into the silk and wine diseases. In Germany the ravages committed by insects on their forests have been the subject of various works, published chiefly under the patronage of the Austrian Government and scientific associations. In North America Mr. Riley, as Missouri State entomologist, makes annual reports on noxious insects to the Board of Agriculture of that State, pursuant to an appropriation for this purpose from the Legislature.* In Italy a special institution has been formed at Padua, under official patronage, for the study of cryptogamic parasites; and our Royal Horticultural Society is also making arrangements for the special encouragement of the study of economic entomology. To these and similar institutions it is the duty of science, in the interest of mankind, to give its unqualified support, to divest itself of all preconceived theories and prejudices, to avoid those polemical discussions which appear to have gone beyond the security they give for the exhibition of facts in all the various points of view they may bear, but impartially to study every detail connected with these scourges, which have so much increased during the present century, fostered, perhaps, by the advance of civilisation and high cultivation.

SCIENTIFIC SERIALS

THE *Lens* (No. 2), April, 1872.—This second number of the new American journal of microscopy contains little that is new or of importance. "The Flora of Chicago and its Vicinity" is continued by H. H. Babcock from the previous number, as is also the "Conspectus of the Families and Genera of the Diatomaceæ," by Prof. H. L. Smith. This second part of the Conspectus is occupied by a "Synonym Register," which promises to be useful, and is in fact the most complete attempt of the kind yet made. "Microscopical Memoranda for the use of Practitioners of Medicine," by Dr. J. J. Woodward, is also a continuation, and consists of two parts, viz., staining the sections, and mounting the stained sections in Canada balsam. There is also a chapter "On the double marking of *Triceratium*," by the same author, accompanied by a Woodbury print of two frustules of *Triceratium fimbriatum*. "On the effect of the reversal of the current of the Chicago River on the Hydrant Water," by H. H. Babcock. "Where to search for Diatomaceæ" is a reprint from the *Intellectual Observer*, and "Alternation of generation in Fungi," by M. C. Cooke, from NATURE. This number of the *Lens* is increased to double the thickness of the previous one by the insertion of the catalogue of optical instruments manufactured or sold by an American firm in Philadelphia and New York.

IN the *American Naturalist* for April we have an article by Dr. J. J. Woodward on the Use of *Amphipleura pellucida* as a Test-object for High Powers, illustrated by a photograph. Dr. Abbott concludes his exhaustive paper on the Stone Age of New Jersey; and the remainder of the number consists of reviews and book notices, and of short paragraphs under the headings of the various departments of natural science.

In the number for May is a note by Mr. J. G. Henderson on the use of the rattles of the rattlesnake, in which he comes to a somewhat different conclusion from Prof. Shaler, believing that it is protective in its object.—Mr. J. A. Allen contributes some ornithological notes from the West, the present communication referring to the birds of Kansas.—Prof. A. H. Tuttle gives the result of a careful study of the genus *Urella* of Flagellate Infusoria, illustrated with a number of woodcuts.

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* Since writing the above I have seen a proof-sheet of a portion of the forthcoming fourth report of the Missouri State entomologist, Mr. Riley, in which he enters into further details of the history of the *Phylloxera*, collected during a recent visit to Europe, as well as from closer observations on the subject made in America, where it appears to be acquiring more serious importance. I have not, however, yet seen enough of the report to learn what further conclusions Mr. Riley may have arrived at.

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There are also useful practical papers of instructions for herborising, for collecting micro-lepidoptera, and for preparing birds' eggs; as well as a large number of interesting paragraphs of information under the heads of the natural sciences.

THE *Journal of the Frankin Institute* for May contains a good drawing of Danks's patent puddling furnace, and a large number of paragraphs under the head "Items and Novelties." The substantial articles include a continuation of Prof. Nourse's paper on inter-oceanic communication across Central America; Mr. John Warner on the diamond rock drill; Mr. C. Van Bruol on a new modification of the Holtz machine, and a list of auroral displays during February at a number of stations in the United States; and the continuation of various other papers commenced in the preceding numbers.

THE number of the *Transactions of the Linnean Society* just published, vol. xxix. part 1, contains the commencement of Colonel Grant's Botany of the Speke and Grant Expedition, including an enumeration of the plants collected during the journey of the late Captain J. H. Speke and Captain J. A. Grant from Zanzibar to Egypt in 1860-63. The determinations and descriptions of the species are by Prof. Oliver, Mr. J. G. Baker, and other botanists connected with the Kew Herbarium; while Colonel Grant writes an introductory preface, alphabetical list of native names, and notes. It is prefaced by a good map of the whole of the journey; and illustrated by thirty-seven drawings on stone of new or remarkable species. The total number in the whole paper will be 100.

SOCIETIES AND ACADEMIES

LONDON

Geological Society, May 22.—Prof. Morris, vice-president, in the chair. The following communications were read:—1. A communication from the Right Hon. Earl Granville, inclosing a report from H. M. Minister at Rome, relating to the recent eruption of Vesuvius. 2. "On the Phosphatic Nodules of the Cretaceous Rock of Cambridgeshire," by the Rev. O. Fisher, M.A., F.G.S. This paper contained an attempt to explain the origin of the phosphatic nodules which lie in a thin bed at the base of the Chalk in Cambridgeshire, and are largely extracted by washing the stratum for the purpose of making superphosphate of lime. Two hundred and seventy tons per acre, at the rate of fifty shillings a ton, represents the valuable yield of the deposit, which is followed to the depth of about 18 feet. The nodules and other fossils of the bed are chiefly derivative, forming a concentrated accumulation from a deposit belonging to the Lower Cretaceous period. Some of the fossils are, however, believed to be indigenous to the deposit. *Plicatulæ* are attached to all the derivative fossils and nodules, and the sharp, broken surfaces of the latter, with *Plicatulæ* on them, show that they were mineralised before they were deposited in their present *gisement*. The green grains of chlorite have been drifted into patches. Certain calcareous organisms are preserved, but many genera of molluscs only occur as casts in phosphate of lime. The phosphatic matter has been determined in its deposition by *animal* substances. There are two chief varieties of the "ordinary" nodules. The first are amorphous, or else finger-shaped; the second formed like a long cake rolled partially or wholly upon a stick. The surface of these two kinds of nodules is coriaceous and wrinkled, and they usually show marks of attachment to some foreign body. Certain species, clearly zoophytes, are converted into phosphatic nodules, and, when sections are made of these, they are found to show under the microscope structures and spiculæ allied to those of Alcyonaria. Slices of the *common* nodules show similar spicular, and occasionally reticular structure. When casts in plaster are made from *Alcyonium digitatum*, and coloured to resemble the nodules, the similarity in general form and structure of surface is very striking. The phosphate was probably segregated by the animal matter from its solution in water charged with carbonic acid, which is a known solvent of the phosphate; an analysis of the matrix has proved that phosphate of lime is appreciably present in it. The author doubted the derivation of the nodules from the denudation of the subjacent Gault, and exhibited a collection of these to show that they were distinguished by more stunted growth. The deposit was on the whole considersd to represent the thin band with similar fossils at the base of the Chloritic Marl, as seen in the West of England, in which district it is underlain by the true arenaceous Greensand. The absence of the true Greensand was attributed to the intervention of the old palæozoic axis of the London area; and it was finally suggested that a similar axis might stretch from Leicestershire to Harwich, causing the change in character of the Lower Cretaceous beds between Cambridgeshire and Norfolk.—3. "Some observations on the Upper Greensand formation of Cambridge," by Mr. W. Johnstone Sollas. The Greensand Formation consists around Cambridge of a Chalk marl containing harder portions of a different nature disseminated throughout it, these are separated from the Chalk Marl by levigation, and sorted by sifting into larger bodies, consisting almost entirely of the so-called "coprolites," and smaller bodies—the so-called "Greensand." The author gave a general account of his conclusions regarding the "coprolites," reserving details for a future communication. Of all the facts the most obvious is the connection between presence of "coprolite" and former existence of organic matter; when coprolite is found incrusting a bone or other fossil, it is precisely on those parts where animal matter adhered most abundantly. Instances were cited, as in *Palæocorystes*, where the absence of animal matter on the back of the carapace is marked by an absence of phosphatic incrustation; while the sternal side, where animal matter could easily escape, is often altogether embedded in "coprolite." Coprolites are the fossilisation of organic matter derived from very various sources. In many cases they owe their origin to sponges, almost certainly so in the case of cylindrical coprolites perforated by a cylindrical cavity, now filled up with Chalk Marl; other forms have an *allied* origin. Thus coprolites are the flints of the Gault. The Greensand is a mixture of calcareous, silicious, and dark-coloured grains of uncertain chemical composition. The calcareous grains consist of sponge spicules, minute shells, fragments and prisms of shell substance, bivalve entomostraca, microscopic corals, minute echinoderm species, polyzoa, and foraminifera. A list was given of the foraminifera, the abundant occurrence of *Lagma* here being particularly noticed, as, with the exception of *L. apiculata*, mentioned by Reuss, the genus had not before been noticed below the Maestricht Chalk. The silicious grains consist of fragments of various rocks, some of volcanic origin. The dark coloured grains are coprolitic *débris* and true green grains. The green grains are almost all casts of foraminifera, derived chiefly from *Bulimina*; others are derived from *Lituola*, *Rotalina*, *Globigerina*, and other forms. Some green grains of exactly the same nature had been found by the author in the silicious sand of Blackdown.—Prof. Phillips was glad that his casual remark had produced such satisfactory results as the paper he had heard. It was satisfactory to find that the bulk of the phosphatic nodules exhibited such marked traces of an organic origin. Though he had to some extent been prepared for this, it appeared that the view might be extended much further than would at first sight have been anticipated. He drew an analogy between the preservation of the forms of sponges in their silicified fossils with that of the soft organic bodies in the Greensand by phosphatic matter. In each case the surrounding water contributed a large amount of either flint or phosphate of lime, which was segregated and accumulated round certain centres or nuclei of organic bodies.—Prof. Ramsay inquired from what sources the abundance of phosphatic matter requisite for the production of these fossils could have been derived. In such thin strata, which seemed to indicate a transition from a land to a marine surface, it was a matter of great difficulty to his mind to account for so great an abundance of phosphatic matter.—Mr. Godwin-Austen remarked that phosphoric acid was largely present in sea water, and instanced the present seas, where, as on the Newfoundland banks, fish existed in enormous quantities, and no doubt also phosphatic matter. The Cambridge beds, though so rich, were by no means unique of their kind. He referred to a paper communicated some years ago to the Society by Mr. Payne, as affording many interesting particulars with regard to such beds. He considered that much of the phosphate attaching to decaying animal matter might have been derived from comminuted excrementitious deposits floating in the water.—The Rev. T. G. Bonney remembered a fact quoted by the late Dr. Mantell as to the large quantities of dead Mollusca which had been observed floating down some of the American rivers, and which had been regarded as a plentiful source of phosphatic matter. Small fishes might also have furnished a considerable quantity, and their value as manure was recognised at the present day. With regard to the nodules being Alcyonaria or sponges, he observed that what spicules he had seen appeared more like those of sponges. He agreed with Mr.

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